

## REMARKS

Claims 1-5, 7-9, 13-14 and 16-18 have been rejected as anticipated by US Patent 5,734,108 (hereinafter "Walker"). Claims 1-7 and 9-18 have been rejected as anticipated by US Patent 6,323,943 (hereinafter "Maruyama"). The rejections are respectfully traversed.

The rejections are based on an incorrect interpretation of the prior art. The independent claims do not read on the prior art cited. Withdrawal of the outstanding rejections is requested.

Apparatus claim 1 requires that "the detector and the optical radiation source [are] adapted to be located opposite each other with the oscillating object located between the source and the detector so that the object blocks a portion of the sensing areas from receiving optical radiation from the source." This arrangement forms a shadow image of the object (capillary tip) on the detector (see Figure 2; see page 11, line 15 to page 12, line 10 of the patent specification).

The technical significance of this structure is that the detection principle of the invention is based upon an optical projection principle, wherein the detector measures the amount of radiation energy that is projected from the radiation source. The oscillating amplitude detected depends on the amount of radiation that is blocked by the object.

In the cited prior art, the principle used in the apparatus is reflection. The principle of reflection has its disadvantages, such as the need for the surface of the object to be reflective and sufficiently flat, to allow the radiation to be reflected at all times to a location of a sensor which is placed at a relatively fixed position. If, for example, the object is a capillary tip of a wire bonder, the capillary is commonly made of ceramic, which has a low reflective index, is of a

small size and is cylindrical in shape. These characteristics would make detecting reflected light very difficult.

In Walker, the object that is being monitored (such as a shaft) is rotating, not oscillating, and there is no suggestion to measure oscillation amplitude as expressly set forth in claim 1. It detects relative movement between an optical sensor unit and a set of finely spaced, parallel grid lines (see Abstract) by detecting scattering of the radiation energy caused by the lines passing in front of the sensor unit as the object rotates.

Furthermore, the detector (installed in the turret disk 216, according to Figure 2 and Col. 12, lines 11-19) and the optical radiation source 208 are NOT located opposite each other with the [oscillating] object 112 located between the source 208 and the detector 216, as required by claim 1. Figure 2a shows this structure clearly, with the object 112 at one end, the optical radiation source 208 in the middle, and the detector 216 at the other end. The detector 216 thus detects reflection off the surface of the object 112.

In Maruyama, the structure is similar to the one in Walker, but again, different from the structure set forth in claim 1. Referring to Figure 6 of Maruyama, the oscillating object 1 is at one end and the detector 6 at the other end, with the optical radiation source 4 located between the object 1 and the detector 6, contrary to the terms of claim 1. The Maruyama patent therefore also relies on the principle of reflection, although in this case, the reflected laser beam from the object is mixed with the original oscillating laser beam to output a beat wave (see Abstract).

For at least these reasons, claim 1 is patentably distinguishable from the two cited references. Claims 2-12 are dependent from claim 1, and they are patentable for all of the reasons stated above, in addition to patentable subject matter included in each claim.

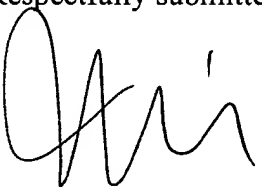
Claim 13 is a method claim with a similar limitation, namely that "the method [comprises] positioning an optical radiation source and an optical radiation detector on opposite sides of the object". As explained already, the structures in the prior art have the object positioned on one side, the detector positioned on the other side, and the optical radiation source between the object and the detector. Therefore, the invention claimed in claim 13 is not anticipated by Walker or Maruyama. As claims 14-18 are dependent on claim 13, claims 14-18 are patentable at least for the reasons already stated.

Therefore, it is submitted that neither prior art reference anticipates the present claims..  
Favorable reconsideration and allowance of this application are respectfully solicited.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on October 24, 2002:

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Respectfully submitted,

  
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